

SEQUENCE LISTING

RECEIVED

MAR 02 2010

1600/2000

<110> Mello, Charlene M.
Arcidiacono, Steven

<120> Novel Purification and Fiber Spinning Techniques for
Protein Fibers

<130> ARMY-03665

<140> 09/490,291

<141> 2000-01-20

<160> 11

<170> PatentIn Ver. 2.0

<210> 1

<211> 876

<212> DNA

<213> Nephila clavipes

<400> 1

```

atgagaggat cgcatacaca tcaccatcac ggatccatgg ctacgcggtag aggcgggctg 60
ggtggccagg gtgcagggtgc ggctgcggct gccgcggcag cggccgcagg cgggtgccggc 120
caaggtggct atggcggcct gggttctcag gggactagcg gtagaggcgg gctgggtggc 180
cagggtgcag gtgcggctgc ggctgccgcg gcagcggccg caggcgggtgc cggccaaggt 240
ggctatggcg gcctgggttc tcaggggact agcggtagag gcgggctggg tggccagggt 300
gcagggtgcgg ctgcggctgc cgcggcagcg gccgcaggcg gtgccggcca aggtggctat 360
ggcggcctgg gttctcaggg gactagcggg agaggcgggc tgggtggcca ggggtgcagg 420
gcggtgcggc ctgccgcggc agcggccgca ggcggtgccg gccaaagggtg ctatggcggc 480
ctgggttctc aggggactag cggtagaggc gggctgggtg gccagggtgc aggtgcggct 540
gcggtgcggc cggcagcggc cgcaggcggg gccggccaag gtggctatgg cggcctgggt 600
tctcagggga ctacgcggtag aggcgggctg ggtggccagg gtgcagggtgc ggctgcggct 660
gccgcggcag cggccgcagg cgggtgccggc caaggyggct atggcggcct gggttctcag 720
gggactagcg gtagaggcgg gctgggtggc cagggtgcag gtgcggctgc ggctgcccg 780
gcagcggccg caggcgggtgc cggccaaggt ggctatggcg gcctgggttc tcaggggact 840
agtgggatcc gtcgacctgc agccaagctt aattag 876

```

<210> 2

<211> 291

<212> PRT

<213> Nephila clavipes

<400> 2

```

Met Arg Gly Ser His His His His His Gly Ser Met Ala Ser Gly
  1           5           10          15
Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala
  20          25          30
Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly
  35          40          45
Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly
  50          55          60
Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly
  65          70          75          80
Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu
  85          90          95

```

Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala
 100 105 110
 Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr
 115 120 125
 Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala
 130 135 140
 Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly
 145 150 155 160
 Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly
 165 170 175
 Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly
 180 185 190
 Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly
 195 200 205
 Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala
 210 215 220
 Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln
 225 230 235 240
 Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala
 245 250 255
 Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr
 260 265 270
 Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Ile Arg Arg Pro Ala Ala
 275 280 285

Lys Leu Asn
290

<210> 3
 <211> 2046
 <212> DNA
 <213> *Nephila clavipes*

<400> 3
 atgagaggat cgcataccca tcaccatcac ggatccatgg ctagecggtag aggcgggctg 60
 ggtggccagg gtgcaggtgc ggctgcggct gccgcggcag cggccgcagg cggcgccggc 120
 caaggtggct atggcgccct gggttctcag gggactagcg gtagaggcgg gctgggtggc 180
 caggggtgcag gtgcggctgc ggctgccgcg gcagcggccg caggcgggtgc cggccaaggt 240
 ggctatggcg gcctgggttc tcaggggact agcggtagag gcgggctggg tggccagggg 300
 gcaggtgcgg ctgcggctgc cgcggcagcg gccgcaggcg gtgccggcca aggtggctat 360
 ggcggcctgg gttctcaggg gactagcggg agaggcgggc tgggtggcca gggcgaggt 420
 gcggctgcgg ctgccgcggc agcggccgca ggcgggtgcc gccaaggtgg ctatggcggc 480
 ctgggttctc aggggactag cgggtccggg ggttatggc cgggtcaaca aactagcggg 540
 agaggcgggc tgggtggcca ggggtgcaggt gcggctgcgg ctgccgcggc agcggccgca 600
 ggcgggtgcc gccaaggtgg ctatggcggc ctgggttctc aggggactag cggtagaggc 660
 gggctgggtg gccaggggtg aggtgcggct gcggctgccg cggcagcggc cgcaggcggg 720
 gccggccaag gtggctatgg cggcctgggt tctcagggga ctagecggtag aggcgggctg 780
 ggtggccagg gtgcaggtgc ggctgcggct gccgcggcag cggccgcagg cggcgccggc 840
 caaggtggct atggcgccct gggttctcag gggactagcg gtagaggcgg gctgggtggc 900
 caggggtgcag gtgcggctgc ggctgccgcg gcagcggccg caggcgggtgc cggccaaggt 960
 ggctatggcg gcctgggttc tcaggggact agcgggtccg gcgggttatg tccgggtcaa 1020

```

caaaactagcg gtagaggcgg gctgggtggc caggggtgcag gtgcggtgc ggctgccgcg 1080
gcagcgcccg caggcgggtgc cggccaaggt ggctatggcg gcctgggttc tcaggggact 1140
agcggtagag gcgggctggg tggccagggt gcaggtgcgg ctgcggtgc cgcggcagcg 1200
gccgcaggcg gtgccggcca aggtggctat ggcggcctgg gttctcaggg gactagcgg 1260
agaggcgggc tgggtggcca ggggtgcaggt gcggctgcgg ctgccgcggc agcggccgca 1320
ggcgggtgcc gccaaaggtg ctatggcggc ctgggttctc aggggactag cggtagaggc 1380
gggctgggtg gccagggtgc aggtgcggct gcggctgccg cggcagcggc cgcaggcgg 1440
gccggccaag gtggctatgg cggcctgggt tctcagggga ctacgggtcc gggcggttat 1500
ggtccgggtc aacaaactag cggtagaggc gggctgggtg gccagggtgc aggtgcggct 1560
gcggtgcggc cggcagcggc cgcaggcggg gccggccaag gtggctatgg cggcctgggt 1620
tctcagggga ctacggtag aggcgggctg ggtggccagg gtgcaggtgc ggctgcggct 1680
gccgcggcag cggcgcagg cgggtgcggc caaggtggct atggcggcct gggttctcag 1740
gggactagcg gtagaggcgg gctgggtggc caggggtgcag gtgcggtgc ggctgccgcg 1800
gcagcgcccg caggcgggtgc cggccaaggt ggctatggcg gcctgggttc tcaggggact 1860
agcggtagag gcgggctggg tggccagggt gcaggtgcgg ctgcggtgc cgcggcagcg 1920
gccgcaggcg gtgccggcca aggtggctat ggcggcctgg gttctcaggg gactagcgg 1980
ccgggcgggt atggtccggg tcaacaaact agtgggatcc gtcgacctgc agccaagctt 2040
aattag

```

<210> 4
 <211> 681
 <212> PRT
 <213> Nephila clavipes

```

<400> 4
Met Arg Gly Ser His His His His His His Gly Ser Met Ala Ser Gly
  1              5              10              15

Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala
  20              25              30

Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly
  35              40              45

Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly
  50              55              60

Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly
  65              70              75              80

Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu
  85              90              95

Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala
 100              105              110

Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr
 115              120              125

Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala
 130              135              140

Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly
 145              150              155              160

Leu Gly Ser Gln Gly Thr Ser Gly Pro Gly Gly Tyr Gly Pro Gly Gln
 165              170              175

Gln Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala
 180              185              190

```

Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr
 195 200 205
 Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly
 210 215 220
 Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly
 225 230 235 240
 Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly
 245 250 255
 Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala
 260 265 270
 Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly
 275 280 285
 Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly
 290 295 300
 Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly
 305 310 315 320
 Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Pro Gly Gly Tyr
 325 330 335
 Gly Pro Gly Gln Gln Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly
 340 345 350
 Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly
 355 360 365
 Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly
 370 375 380
 Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala
 385 390 395 400
 Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln
 405 410 415
 Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala
 420 425 430
 Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr
 435 440 445
 Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly
 450 455 460
 Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly
 465 470 475 480
 Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly
 485 490 495
 Pro Gly Gly Tyr Gly Pro Gly Gln Gln Thr Ser Gly Arg Gly Gly Leu
 500 505 510
 Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala
 515 520 525

Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr
 530 535 540
 Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala
 545 550 555 560
 Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly
 565 570 575
 Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly
 580 585 590
 Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly
 595 600 605
 Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly
 610 615 620
 Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala
 625 630 635 640
 Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln
 645 650 655
 Gly Thr Ser Gly Pro Gly Gly Tyr Gly Pro Gly Gln Gln Thr Ser Gly
 660 665 670
 Ile Arg Arg Pro Ala Ala Lys Leu Asn
 675 680

<210> 5
 <211> 2076
 <212> DNA
 <213> *Nephila clavipes*

<400> 5
 atggctagca tgactggtgg acagcaaagt ggtcgcggtat ccatggctag cggtagaggc 60
 gggctgggtg gccagggtgc aggtgcggtc gcggctgccg cggcagcggc cgcaggcggg 120
 gccggccaag gtggctatgg cggcctgggt tctcagggga ctacgggtag aggcgggctg 180
 ggtggccagg gtgcaggtgc ggctgcggtc gccgcggcag cggccgcagg cgggtgccggc 240
 caaggtggct atggcggcct gggttctcag gggactagcg gtagaggcgg gctgggtggc 300
 cagggtgcag gtgcggctgc ggctgccgcg gcagcggccg caggcgggtc cggccaagg 360
 ggctatggcg gcctgggttc tcaggggact agcggtagag gcgggctggg tggccagggt 420
 gcaggtgcgg ctgcggctgc cgcggcagcg gccgcaggcg gtgccggcca aggtggctat 480
 ggcggcctgg gttctcaggg gactagcggg ccgggcgggt atggtccggg tcaacaaact 540
 agcggtagag gcgggctggg tggccagggt gcaggtgcgg ctgcccgtgc cgcggcagcg 600
 gccgcaggcg gtgccggcca aggtggctat ggcggcctgg gttctcaggg gactagcggg 660
 agagggcggc tgggtggcca ggggtgcagg gcggctgcgg ctgccgcggc agcggccgca 720
 ggcgggtgcg gccaaagggt ctatggcggc ctgggttctc aggggactag cggtagaggc 780
 gggctgggtg gccagggtgc aggtgcggtc gcggctgccg cggcagcggc cgcaggcggg 840
 gccggccaag gtggctatgg cggcctgggt tctcagggga ctacgggtag aggcgggctg 900
 ggtggccagg gtgcaggtgc ggctgcggtc gccgcggcag cggccgcagg cgggtgccggc 960
 caaggtggct atggcggcct gggttctcag gggactagcg gtccgggcgg ttatggtccg 1020
 ggtcaacaaa ctacgggtag aggcgggctg ggtggccagg gtgcaggtgc ggctgcccgt 1080
 gccgcggcag cggccgcagg cgggtgccgc caaggtggct atggcggcct gggttctcag 1140
 gggactagcg gtagaggcgg gctgggtggc cagggtgcag gtgcggctgc ggctgcccg 1200
 gcagcggccg caggcgggtc cggccaaggg ggctatggcg gcctgggttc tcaggggact 1260
 agcggtagag gcgggctggg tggccagggt gcaggtgcgg ctgcccgtgc cgcggcagcg 1320
 gccgcaggcg gtgccggcca aggtggctat ggcggcctgg gttctcaggg gactagcggg 1380
 agagggcggc tgggtggcca ggggtgcagg gcggctgcgg ctgccgcggc agcggccgca 1440
 ggcgggtgcg gccaaagggt ctatggcggc ctgggttctc aggggactag cgggtccggg 1500
 gggttatggtc cgggtcaaca aactagcggg agagggcggc tgggtggcca ggggtgcagg 1560

gcggctgctg ctgccgcggc agcggccgca ggcggtgccg gccagggtgg ctatggcggc 1620
ctgggttctc aggggactag cggtagaggc gggctgggtg gccagggtgc aggtgctggc 1680
gcggctgccc cggcagcggc cgcaggcggg gccggccaag gtggctatgg cggcctgggt 1740
tctcagggga ctagcggtag aggcgggctg ggtggccagg gtgcagggtc ggctgctggc 1800
gccgcggcag cggccgcagg cgggtgccggc caagggtggc atggcggcct gggttctcag 1860
gggactagcg gtagaggcgg gctgggtggc cagggtgcag gtgcggctgc ggctgcccg 1920
gcagcggccg caggcgggtc cggccaaggt ggctatggcg gcctgggttc tcaggggact 1980
agcgggtccg cgggttatgg tccgggtcaa caaactagtg ggatccgaat tcgagctccg 2040
tcgacaagct tcgagcacca ccaccaccac cactga 2076

<210> 6
<211> 691
<212> PRT
<213> Nephila clavipes

<400> 6
Met Ala Ser Met Thr Gly Gly Gln Gln Met Gly Arg Gly Ser Met Ala
1 5 10 15
Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala
20 25 30
Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly
35 40 45
Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly
50 55 60
Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly
65 70 75 80
Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly
85 90 95
Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala
100 105 110
Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln
115 120 125
Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala
130 135 140
Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr
145 150 155 160
Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Pro Gly Gly Tyr Gly Pro
165 170 175
Gly Gln Gln Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly
180 185 190
Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly
195 200 205
Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu
210 215 220
Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala
225 230 235 240

Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr
 245 250 255
 Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala
 260 265 270
 Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly
 275 280 285
 Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly
 290 295 300
 Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly
 305 310 315 320
 Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Pro Gly
 325 330 335
 Gly Tyr Gly Pro Gly Gln Gln Thr Ser Gly Arg Gly Gly Leu Gly Gly
 340 345 350
 Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly
 355 360 365
 Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly
 370 375 380
 Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala
 385 390 395 400
 Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly
 405 410 415
 Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly
 420 425 430
 Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly
 435 440 445
 Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu
 450 455 460
 Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala
 465 470 475 480
 Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr
 485 490 495
 Ser Gly Pro Gly Gly Tyr Gly Pro Gly Gln Gln Thr Ser Gly Arg Gly
 500 505 510
 Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala
 515 520 525
 Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln
 530 535 540
 Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala
 545 550 555 560
 Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr
 565 570 575

Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly Arg Gly Gly Leu Gly Gly
 580 585 590
 Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly
 595 600 605
 Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Thr Ser Gly
 610 615 620
 Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala
 625 630 635 640
 Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly
 645 650 655
 Ser Gln Gly Thr Ser Gly Pro Gly Gly Tyr Gly Pro Gly Gln Gln Thr
 660 665 670
 Ser Gly Ile Arg Ile Arg Ala Pro Ser Thr Ser Phe Glu His His His
 675 680 685
 His His His
 690

<210> 7
 <211> 1588
 <212> DNA
 <213> *Nephila clavipes*

<400> 7
 atggctagca tgactggtgg acagcaaagt ggtcggatcc gaattcgtgg atatggaggt 60
 cttggtggac aaggtgccgg acaaggagct ggtgcagccg ccgcagcagc agctggtggt 120
 gccggacaag gaggatatgg aggtccttga agccaagggt ctggacgagg tggacaagggt 180
 gcaggcgagc ccgcagccgc agctggaggt gctggtcaag gaggatacgg aggtccttga 240
 agccaagggt ctggacgagg aggtattaggt ggacaagggt caggtgcagc agcagcagct 300
 ggaggtgtcg gacaaggagg actaggtgga caaggtgctg gacaaggagc tggagcagct 360
 gctgcagcag ctggtggtgc cggacaagga ggatatggag gtctcggagg ccaagggtgca 420
 ggacgaggtg gatcaggtgg acaaggggca ggtgcagcag cagcagcagc tggaggtgcc 480
 ggacaaggag gatattggagg tcttggaaag caaggtgcag gacgaggtgg attaggtgga 540
 caggtgtcag gtgcagcagc agcagcagca gccggaggtg ctggacaagg aggatacgggt 600
 ggtccttggtg gacaagggtgc cggacaagggt ggctatggag gacttggagg ccaagggtgct 660
 ggacgaggag gattaggtgg acaagggtgca ggtgcagcag cagcagctgg aggtgccgga 720
 caaggaggac taggtggaca aggtgctgga gcagccgctg cagcagctgg tgggtgccgga 780
 caaggaggat atggaggtct tggaaagcaa ggtgctggac gaggtggaca aggtgcaggc 840
 gcagccgcag cagcagccgg aggtgctgga caaggaggat acggtggaca aggtgccgga 900
 caaggaggct atggaggact tggaaagcaa ggtgctggac gaggaggatt aggtggacaa 960
 ggtgcaggtg cagcagcagc agcagcagca gctggaggtg ccggacaagg aggtattaggt 1020
 ggacaagggt caggtgcagc agcagcagca gctggaggtg ctggacaagg aggtattaggt 1080
 ggacaagggt ctggacaagg agctggagca gccgctgcag cagccgctgc agcagctggt 1140
 ggtgttagac aaggaggata tggaggtctt ggaagccaa gtgctggacg aggtggacaa 1200
 ggtgcaggcg cagccgcagc agcagccgga ggtgctggac aaggaggata tgggtggtctt 1260
 ggtggacaag gtgttggacg aggtggatta ggtggacaag gtgcaggcgc agcggcagct 1320
 gttggtgctg gacaaggagg atatggtggt gttggttctg gggcgtctgc tgcctctgca 1380
 gctgcattcc gtttctcttc tcttcaagct agttcaagag tttcatcagc tgtttccaac 1440
 ttggttgcga gtggtctctac taattctgcg gccttgtcaa gtacaatcag taatgtggtt 1500
 tcacaaatag gcgccagcaa tcttgggtctt tctggatgtg atgtcctcat tcaagctctt 1560
 ctcgagcacc accaccacca ccactgaa 1588

<210> 8
 <211> 528
 <212> PRT
 <213> Nephila clavipes

<400> 8
 Met Ala Ser Met Thr Gly Gly Gln Gln Met Gly Arg Ile Arg Ile Arg
 1 5 10 15
 Gly Tyr Gly Gly Leu Gly Gly Gln Gly Ala Gly Gln Gly Ala Gly Ala
 20 25 30
 Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly
 35 40 45
 Leu Gly Ser Gln Gly Ala Gly Arg Gly Gly Gln Gly Ala Gly Ala Ala
 50 55 60
 Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly
 65 70 75 80
 Ser Gln Gly Ala Gly Arg Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala
 85 90 95
 Ala Ala Ala Ala Gly Gly Val Gly Gln Gly Gly Leu Gly Gly Gln Gly
 100 105 110
 Ala Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Gly Gly Ala Gly
 115 120 125
 Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Ala Gly Arg Gly Gly
 130 135 140
 Ser Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Gly Gly Ala
 145 150 155 160
 Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Ala Gly Arg Gly
 165 170 175
 Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Ala Gly
 180 185 190
 Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Gly Gln Gly Ala Gly
 195 200 205
 Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Ala Gly Arg Gly Gly
 210 215 220
 Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Gly Gly Ala Gly
 225 230 235 240
 Gln Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala
 245 250 255
 Gly Gly Ala Gly Gln Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Ala
 260 265 270
 Gly Arg Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Gly Gly
 275 280 285
 Ala Gly Gln Gly Gly Tyr Gly Gly Gln Gly Ala Gly Gln Gly Gly Tyr
 290 295 300

Gly Gly Leu Gly Ser Gln Gly Ala Gly Arg Gly Gly Leu Gly Gly Gln
 305 310 315 320
 Gly Ala Gly Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln
 325 330 335
 Gly Gly Leu Gly Gly Gln Gly Ala Gly Ala Ala Ala Ala Ala Gly
 340 345 350
 Gly Ala Gly Gln Gly Gly Leu Gly Gly Gln Gly Ala Gly Gln Gly Ala
 355 360 365
 Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Gly Gly Val Arg Gln
 370 375 380
 Gly Gly Tyr Gly Gly Leu Gly Ser Gln Gly Ala Gly Arg Gly Gly Gln
 385 390 395 400
 Gly Ala Gly Ala Ala Ala Ala Ala Ala Gly Gly Ala Gly Gln Gly Gly
 405 410 415
 Thr Gly Gly Leu Gly Gly Gln Gly Val Gly Ala Gly Gly Leu Gly Gly
 420 425 430
 Gln Gly Ala Gly Ala Ala Ala Ala Val Gly Ala Gly Gln Gly Gly Tyr
 435 440 445
 Gly Gly Val Gly Ser Gly Ala Ser Ala Ala Ser Ala Ala Ala Ser Arg
 450 455 460
 Leu Ser Ser Pro Gln Ala Ser Ser Arg Val Ser Ser Ala Val Ser Asn
 465 470 475 480
 Leu Val Ala Ser Gly Pro Thr Asn Ser Ala Ala Leu Ser Ser Thr Ile
 485 490 495
 Ser Asn Val Val Ser Gln Ile Gly Ala Ser Asn Pro Gly Leu Ser Gly
 500 505 510
 Cys Asp Val Leu Ile Gln Ala Leu Leu Gly His His His His His His
 515 520 525

<210> 9
 <211> 341
 <212> PRT
 <213> Nephila clavipes

<400> 9
 Ala Glu Ile Tyr Asn Lys Asp Gly Asn Lys Val Asp Leu Tyr Gly Lys
 1 5 10 15
 Ala Val Gly Leu His Tyr Phe Ser Lys Gly Asn Gly Glu Asn Ser Tyr
 20 25 30
 Gly Gly Asn Gly Asp Met Thr Tyr Ala Arg Leu Gly Phe Lys Gly Glu
 35 40 45
 Thr Gln Ile Asn Ser Asp Leu Thr Gly Tyr Gly Gln Trp Glu Tyr Asn
 50 55 60

Phe Gln Gly Asn Asn Ser Glu Gly Ala Asp Ala Gln Thr Gly Asn Lys
 65 70 75 80
 Thr Arg Leu Ala Phe Ala Gly Leu Lys Tyr Ala Asp Val Gly Ser Phe
 85 90 95
 Asp Tyr Gly Arg Asn Tyr Gly Val Val Tyr Asp Ala Leu Gly Tyr Thr
 100 105 110
 Asp Met Leu Pro Glu Phe Gly Gly Asp Thr Ala Tyr Ser Asp Asp Phe
 115 120 125
 Phe Val Gly Arg Val Gly Gly Val Ala Thr Tyr Arg Asn Ser Asn Phe
 130 135 140
 Phe Gly Leu Val Asp Gly Leu Asn Phe Ala Val Gln Tyr Leu Gly Lys
 145 150 155 160
 Asn Glu Arg Asp Thr Ala Arg Arg Ser Asn Gly Asp Gly Val Gly Gly
 165 170 175
 Ser Ile Ser Tyr Glu Tyr Glu Gly Phe Gly Ile Val Gly Ala Tyr Gly
 180 185 190
 Ala Ala Asp Arg Thr Asn Leu Gln Glu Ala Gln Pro Leu Gly Asn Gly
 195 200 205
 Lys Lys Ala Glu Gln Trp Ala Thr Gly Leu Lys Tyr Asp Ala Asn Asn
 210 215 220
 Ile Tyr Leu Ala Ala Asn Tyr Gly Glu Thr Arg Asn Ala Thr Pro Ile
 225 230 235 240
 Thr Asn Lys Phe Thr Asn Thr Ser Gly Phe Ala Asn Lys Thr Gln Asp
 245 250 255
 Val Leu Leu Val Ala Gln Tyr Gln Phe Asp Phe Gly Leu Arg Pro Ser
 260 265 270
 Ile Ala Tyr Thr Lys Ser Lys Ala Lys Asp Val Glu Gly Ile Gly Asp
 275 280 285
 Val Asp Leu Val Asn Tyr Phe Glu Val Gly Ala Thr Tyr Tyr Phe Asn
 290 295 300
 Lys Asn Met Ser Thr Tyr Val Asp Tyr Ile Ile Asn Gln Ile Asp Ser
 305 310 315 320
 Asp Asn Lys Leu Gly Val Gly Ser Asp Asp Thr Val Ala Val Gly Ile
 325 330 335
 Val Tyr Gln Phe Ala
 340

<210> 10
 <211> 225
 <212> DNA
 <213> Nephila clavipes

<400> 10
 atgagaggat cgcacaccca tcaccatcac ggatccatgg ctacgcggtga cctgaaaaaac 60
 aaagtggccc agctgaaaag gaaagttaga tctctgaaag ataaagcggc tgaactgaaa 120
 caagaagtct cgagactgga aaatgaaatc gaagacctga aagccaaaat tggtagacctg 180
 aataacacta gtgggatccg tcgacctgca gccaaagctta attag 225

<210> 11
 <211> 74
 <212> PRT
 <213> Nephila clavipes

<400> 11
 Met Arg Gly Ser His His His His His His Gly Ser Met Ala Ser Gly
 1 5 10 15
 Asp Leu Lys Asn Lys Val Ala Gln Leu Lys Arg Lys Val Arg Ser Leu
 20 25 30
 Lys Asp Lys Ala Ala Glu Leu Lys Gln Glu Val Ser Arg Leu Glu Asn
 35 40 45
 Glu Ile Glu Asp Leu Lys Ala Lys Ile Gly Asp Leu Asn Asn Thr Ser
 50 55 60
 Gly Ile Arg Arg Pro Ala Ala Lys Leu Asn
 65 70